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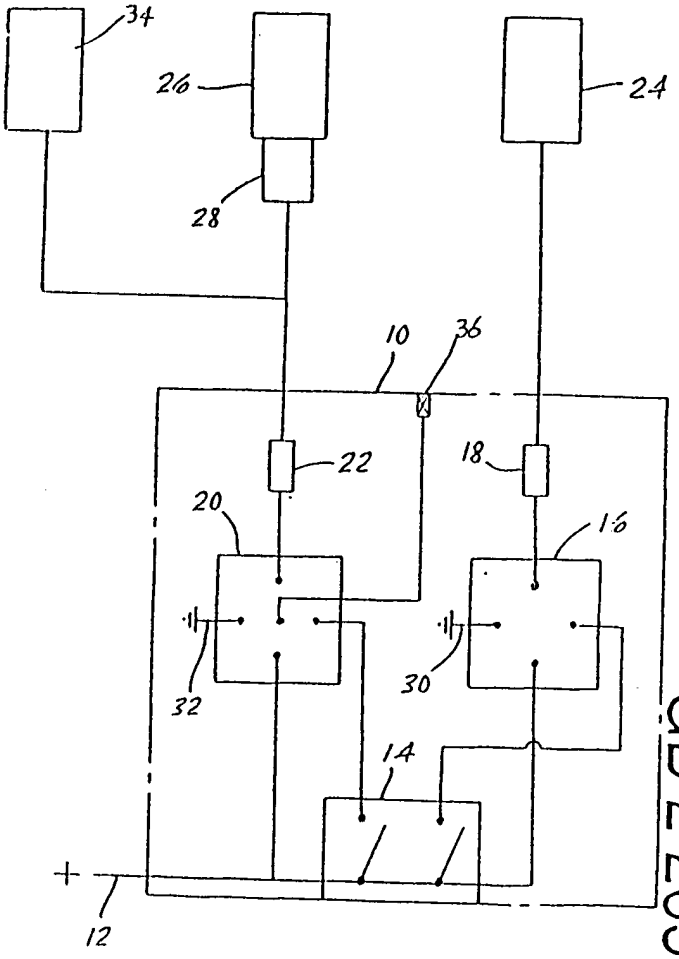
F2F FHD
F1B B2Z

(56) Documents cited
GB 2205620 A GB 2116660 A GB 1309187 A
US 4852681 A US 4621874 A US 4519653 A
US 3968666 A

(58) Field of search
UK CL (Edition L) F1B B2Z, F2F FHD
INT CL[5] B60R, B60T
On-line databases: WPI

(54) Vehicle immobilisation apparatus

(57) Apparatus for immobilising a vehicle which has a pneumatic braking system, for example a commercial vehicle, operates by preventing the supply of compressed air to the vehicle's hand-brake release mechanism. As illustrated, the apparatus includes a multiple-position switch (14) which in a first position de-energises a solenoid valve (24) to prevent that compressed air supply and in a second position also cuts off via a solenoid switch (26) the supply of electricity to at least the engine starting system, and via a solenoid valve (34) the fuel supply to the engine.



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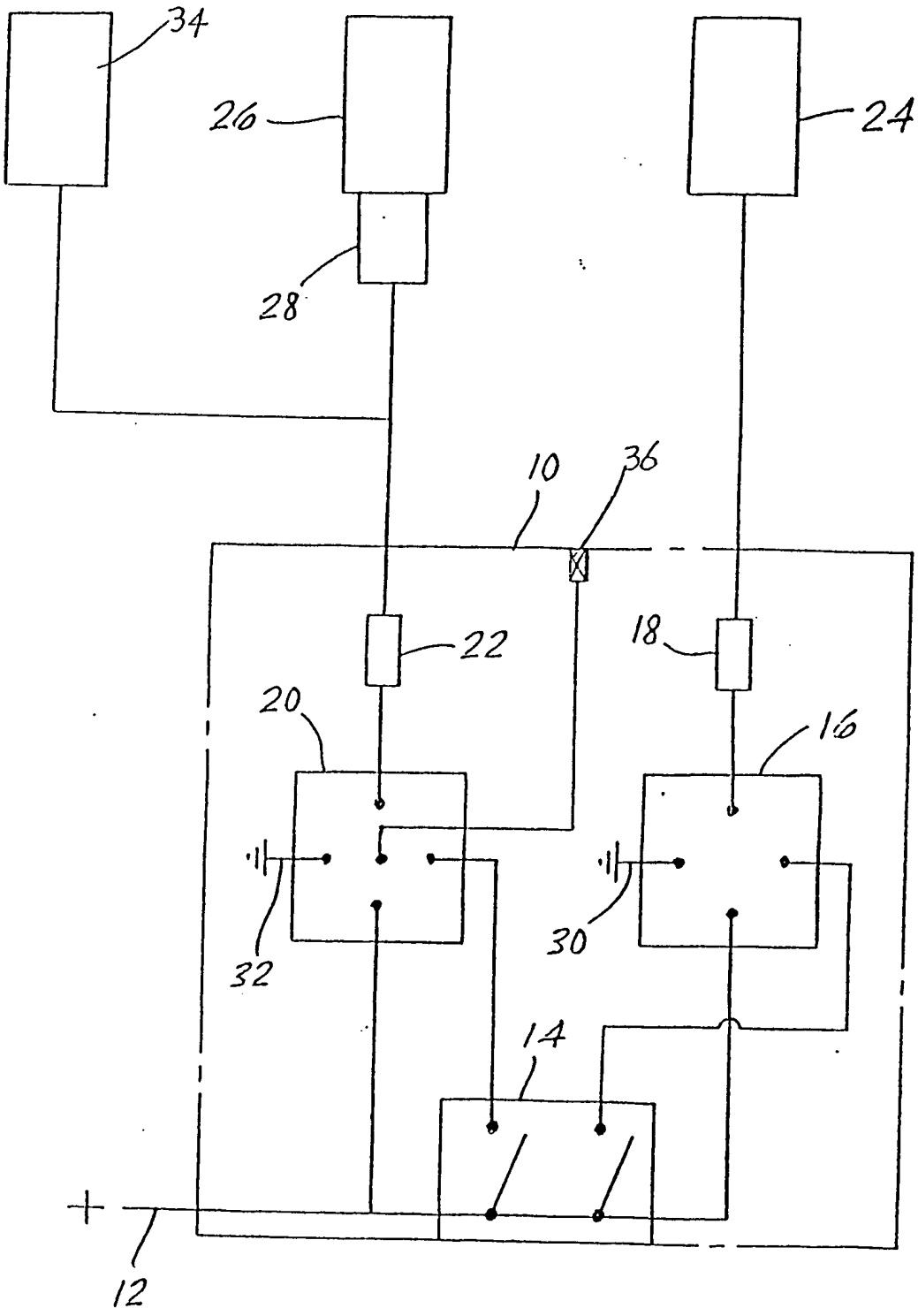
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"Vehicle Immobilisation Apparatus"

This invention relates to apparatus for immobilising a vehicle having a pneumatic braking system. Consequently, it relates principally, if not exclusively, to the immobilisation of commercial vehicles. Such vehicles are frequently provided with electrically-operated auxiliary devices such as electro-hydraulic tail-lifts.

An object of the present invention is to provide a new and effective apparatus for immobilising a vehicle having a pneumatic braking system. A further object is to provide a two-stage immobilising apparatus, the first stage of which can be put into effect without disabling the vehicle's electrically-operated auxiliary devices.

According to the invention, apparatus for immobilising a vehicle having a pneumatic braking system includes means operable to prevent the supply of compressed air to the vehicle's hand-brake release mechanism.

The means preferably comprises a solenoid valve.

Preferably, the arrangement includes also means operable to prevent the supply of electricity to at least the engine starting system.

Preferably, also, the means operable to prevent the supply of electricity does so to all electrically-operated services except the tachograph (if fitted) and the side-lights of the vehicle.

Preferably, the means operable to prevent the supply of electricity comprises a solenoid switch.

Preferably, also, a resistor is connected in series with the solenoid switch to ensure that the nominal voltage of said switch is not exceeded whilst it is energised.

Preferably, the means for preventing the supply of compressed air is operable as a first stage of immobilisation and the means for preventing the supply of electricity is operable as a second stage of immobilisation. As a further feature of the invention, electrical connections are preferably so provided that, when the supply of electricity is prevented, an alarm system

is armed.

Preferably, also, the apparatus includes a multiple-position key-operated switch for operating the two means in successive stages.

The apparatus preferably includes a warning light which is illuminated when the apparatus is inoperative.

A preferred embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawing, which is a basic wiring diagram of apparatus for immobilising a vehicle having a pneumatic braking system.

A commercial vehicle has a pneumatic braking system including a hand-brake mechanism which is applied by a spring and released by compressed air in conventional manner. As shown in the drawing, apparatus for immobilising the vehicle comprises a control box 10 adapted to be mounted in an inconspicuous place within the vehicle's cab. The control box 10 has an electrical in-put 12 and contains a multiple-position key-operated switch 14, a first relay 16 with an associated fuse 18, and a second relay 20 with an associated fuse 22, all wired together as shown. The relay

16 is connected by way of the fuse 18 to a solenoid valve 24 adapted when not energised to close and thereby prevent the supply of compressed air to the hand-brake release mechanism, and the relay 20 is connected by way of the fuse 22 to a solenoid switch 26 adapted when not energised to prevent the supply of electricity to at least the engine starting system and preferably to all the usual electrically-operated services except, for compliance with the law, the tachograph (if fitted) and the side-lights of the vehicle. Vehicle batteries tend to supply slightly more than their rated voltage. A resistor 28 is therefore connected in series with the solenoid of the switch 26 to ensure that the nominal voltage of said solenoid is not exceeded when it is energised during long periods of normal running, to prevent its burning out. Also connected to the relay 20 via the fuse 22 is a further solenoid valve 34 in the fuel supply line of the vehicle.

30 and 32 are connections to earth. An alarm supply connection 36 is directly connected to the relay 20. A warning light on the vehicle's dashboard remains illuminated when the ignition

is switched off but the immobilising apparatus is inoperative. The apparatus is suitable for both 12 volt and 24 volt electrical systems.

In operation, the switch 14 can be moved by its key to a "first stage of immobilisation" position in which it causes the relay 16 to de-energise the solenoid valve 24, which accordingly closes and prevents the release of the hand-brake. The vehicle's electrical system is not affected, and the driver can therefore continue to run the engine if desired and can also continue to use any electrically-operated auxiliary devices. For example, in the case of a vehicle carrying parcels and provided with an electro-hydraulic tail-lift, the driver can immobilise the vehicle by preventing release of the hand-brake but can still operate the tail-lift and load or unload parcels without fear of the vehicle being stolen in his temporary absence. When the vehicle is left completely unattended, however, as at night, the switch 14 is moved by its key successively through its first stage position to a "second stage of immobilisation" position in which, as well as causing de-energisation of the solenoid valve 24 as aforesaid, it also

causes the relay 20 to de-energise the solenoid switch 26 which accordingly disconnects some or most of the vehicle's electrical system so as to isolate at least the engine starting system and preferably all services except those required by law. At the same time, the solenoid valve 34 is de-energised and cuts off the fuel supply to the engine.

In the illustrated embodiment of the apparatus according to the invention, when the switch 14 is moved from its first immobilisation position to its second immobilisation position, electrical power is switched from the output line supplying power to the solenoid switch 26 and solenoid valve 34 to the line feeding the alarm supply connection 36. In this way, when the vehicle has been immobilised by preventing release of the hand-brake, by disconnecting the electric supply to at least the engine starting system and by cutting off the fuel supply to the engine, the vehicle alarm is powered, to give further protection against theft of or from the vehicle.

CLAIMS

1. Apparatus for immobilising a vehicle having a pneumatic braking system, comprising means operable to prevent the supply of compressed air to the vehicle's hand-brake release mechanism.

2. Apparatus as claimed in claim 1, wherein said means comprises a solenoid valve.

3. Apparatus as claimed in either of the preceding claims, further comprising means operable to prevent the supply of electricity to at least the engine starting system.

4. Apparatus as claimed in claim 3, wherein the means operable to prevent the supply of electricity does so to all electrically-operated services except the side-lights of the vehicle and any tachograph which is fitted.

5. Apparatus as claimed in either of claims 3 and 4, wherein the means operable to prevent the supply of electricity comprises a solenoid switch.

6. Apparatus as claimed in claim 5, further comprising a resistor in series with said solenoid switch.

7. Apparatus as claimed in any of claims 3 to 6, wherein the means for preventing the supply of compressed air to the hand-brake mechanism is operable as a first stage of immobilisation and the means for preventing the supply of electricity is operable as a second stage of immobilisation.

8. Apparatus as claimed in claim 7, including a multiple-position key-operated switch for operating the two said means in successive stages.

9. Apparatus as claimed in any of claims 3 to 8, wherein, when the supply of electricity is prevented, an alarm system is armed.

10. Apparatus as claimed in any of the preceding claims, further comprising a solenoid valve operable to interrupt the supply of fuel to the engine of the vehicle.

11. Apparatus as claimed in any of the preceding claims, further comprising a warning light which is illuminated when the apparatus is inoperative.

12. Apparatus for immobilising a vehicle, substantially as hereinbefore described with reference to,and as illustrated in, the accompanying drawing.

Examiner's report to the Comptroller under Section 17 (The Search Report)

9306930.0

Relevant Technical fields

(i) UK Cl (Edition L) F2F (FHD): F1B (B2Z)

(ii) Int Cl (Edition 5) B60R: B60T

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASES: WPI

Search Examiner

P T SQUIRE

Date of Search

18 MAY 1993

Documents considered relevant following a search in respect of claims 1-12

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X,Y	GB 2205620 A (TRANSPORT ELECTRONICS) See whole document	X: 1 Y: 3,5,10
X,Y	GB 2116660 A (BENDIX) See page 1 lines 65-72 96-113	X: 1 Y: 3,5,10
X,Y	GB 1309187 (WESTINGHOUSE) See page 3 line 47 - page 4 line 5	X: 1 Y: 3,5,10
X,Y	US 4621874 (GUSTAFSSON) See column 1 lines 59-65	X: 1 Y: 3,5,10
X,Y	US 4519653 (SMITH) See column 2 lines 20-25	X: 1 Y: 3,5,10
Y	US 4852681 (BOMBLED) See whole document	Y: 3,5
Y	US 3968666 (MACKINNON) See whole document	Y: 10

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).